



May 10, 2013  
Project No. 8128.01.21

Mr. Dana Bayuk  
Oregon Department of Environmental Quality  
2020 SW 4th Avenue  
Portland, Oregon 97201-4987

Re: Fill Zone Well Installation Work Plan  
Siltronic Corporation  
7200 NW Front Avenue, Portland, OR  
ECSI No. 183

Dear Dana:

On behalf of Siltronic Corporation (Siltronic), Maul Foster & Alongi, Inc. (MFA) has prepared this work plan describing our proposal to install three monitoring wells in the Fill water-bearing zone (WBZ) on the Siltronic property. Fill WBZ groundwater elevation data will be collected from the monitoring wells during testing and operation of the alluvial hydraulic containment/control (HC/C) system to evaluate the connection between the water bearing zones, and to support the design considerations of the interceptor trench or alternatives for Fill WBZ source control.

The following sections provide additional detail regarding the rationale for and objectives of the work.

## BACKGROUND AND PURPOSE

As directed<sup>1</sup> by the Oregon Department of Environmental Quality (DEQ), NW Natural (NWN) is implementing a groundwater HC/C source control measure for the NWN Site and a portion of the Siltronic property. The design<sup>2</sup> includes a fully penetrating interceptor trench (IT) for controlling and containing groundwater in the Fill WBZ, if needed. The design and location of the interceptor trench have not been finalized, but DEQ has required installation of the interceptor trench within approximately 6 months following full-time operation of the alluvial HC/C system (projected for December 2014).

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<sup>1</sup> The NWN source control work is being completed consistent with the requirements of: 1) the Joint Order (DEQ Order No. ECVN-NWR-00-27 to NW Natural and Siltronic Corporation (Siltronic), dated October 4, 2000); and 2) the Voluntary Agreement (DEQ No. WMCVM-NWR-94-13, dated August 8, 1994, as amended July 19, 2006).

<sup>2</sup> As described in the January 2012 Revised Groundwater Source Control Construction Design Report, NW Natural Gasco Site and the January 31, 2012 Upper Alluvium Extraction Well Design Work Plan, NW Natural Gasco Site, Portland, Oregon and subsequent related documents.

Additional data regarding the hydrogeologic characteristics, including contaminant concentrations, of the Fill WBZ are required to support the design of the IT, or to identify alternative effective source control measures (SCMs). MFA understands that NWN, with input from Siltronic, is evaluating additional data needs (e.g., geotechnical) required for the interceptor trench design. However, the work proposed herein is time-sensitive to the initial testing phase and is therefore proposed separately.

The Fill WBZ is primarily composed of dredged sediment from the Willamette River, placed on the upland property (later purchased by Siltronic) and into the nearshore area of the river to expand the property boundaries. The Fill WBZ and underlying Alluvial WBZ are separated by a native silt layer of varying thickness and unknown continuity. In general, the thickness of the silt zone decreases with proximity to the riverbank, and may be absent in places throughout the site.

Figure 1 is an overlay of the current property configuration in the vicinity of the riverbank (e.g., property boundary, Fab 1 building, HC/C wells, and top of bank) on a 1963 aerial photograph of the Site. For reference, the figure also includes the currently proposed placement of the interceptor trench, monitoring wells in the vicinity, and outfall location. The figure demonstrates that much of the current riverbank area adjacent to Fab 1 was originally river, and that the current Fill WBZ occurs within material placed over in-river sediments, not on upland native silt.

A potential discontinuity in the upland silt layer and the in-river sediments underlying the Fill WBZ could influence the hydrogeology of the Fill WBZ. The influence of this discontinuity, and the potential effect on the interceptor trench design, could be inferred from Fill WBZ groundwater elevation data collected during the initial testing phase. TCE present in the Fill WBZ in the TCE supplemental source area may be contributing to concentrations of TCE in the alluvial WBZ.

Drawdown in the Alluvial WBZ induced during the initial testing phase could have a measurable effect in the Fill WBZ, and capturing such data will inform our understanding of the hydraulic connection between the two water bearing zones and potential movement of TCE-contaminated groundwater between the two zones. The influence of the HC/C system on the Fill WBZ was identified by DEQ as a data need for the initial testing phase in their email of April 23, 2013.<sup>3</sup> The additional wells are required to fully evaluate the influence of the HC/C system on the Fill WBZ. The following scope of work is recommended to further characterize the Fill WBZ.

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<sup>3</sup> From the email: "DEQ has put together an initial list of example data needs to serve as a starting point for identifying data collection objectives for the initial testing phase:...Further assess the influence of the HC&C system on the Fill WBZ."

## SCOPE OF WORK

On the Siltronic property, groundwater in the Fill WBZ is monitored at the riverbank by WS-8-33 and WS-9-34 (WS-9-34 is not shown on the Figure due to its distance from the proposed interceptor trench alignment). NWN recently installed shallow monitoring wells OW-1-F and OW-2-F, both screened in the Fill WBZ. Groundwater in the Fill WBZ is monitored upgradient of the riverbank in four wells (WS-40/41/42/43-36) in the TCE supplemental source area. These wells are located approximately 400 feet upgradient of the riverbank wells. WS-10-27, which is also completed in the Fill WBZ, is located approximately 350 feet upgradient of the source area.

Additional groundwater data (elevation, gradient, contaminant chemistry) between the source area and the riverbank is required in order to support the design considerations of the interceptor trench. Based on this data need, MFA recommends completing three borings in the Fill WBZ as monitoring wells; the proposed locations are shown on Figure 2.

## INSTALLATION OF MONITORING WELLS

Public and private utility-locating services and other information sources will be used to check for underground utilities before work begins. MFA will coordinate fieldwork to locate possible on-site utilities and piping or other subsurface obstructions.

Preliminary soil borings will be advanced to 35 feet below ground surface in the proposed location of each monitoring well to determine if subsurface conditions are suitable to fulfill the intended purpose of the proposed well. Three monitoring wells will be installed; however, additional borings may be necessary if it is determined in the field that the preliminary boring is not a suitable well location.

Monitoring wells will be installed and developed using methods and equipment consistent with previous work performed on the site; the wells will be constructed using 2-inch-diameter, flush-threaded, Schedule 40 PVC blank riser pipe; 2-inch-diameter, flush-threaded, Schedule 40 PVC well screen with 0.010-inch slots.

Evaluation of baseline conditions will be performed prior to the HC/C system initial testing phase.

## SAMPLING AND ANALYSES

Soil borings will be continuously collected during advancement of the boring using methods and equipment previously approved by DEQ and consistent with previous investigations at the site. Organic vapor levels in the soil samples will be measured in the field by the headspace vapor method utilizing a photoionization detector (PID). No soil samples are proposed.

Groundwater samples will be collected from the wells following completion to establish baseline concentrations of chlorinated volatile organic compounds (cVOCs) and other analytes in groundwater. The following analytes or analyte groups are proposed:

- VOCs by EPA Method 8260 (including 1,2,4-trimethylbenzene and 1,3,5-trimethylbenzene)
- PAHs (SIM) by EPA Method 8270
- Total cyanide, available cyanide, and free cyanide by EPA Methods 335.4, OIA-1677 and D-4282, respectively
- 6000 Series for total metals
- Fixed gases (carbon dioxide, methane, ethane, ethane) by American Society for Testing and Materials (ASTM) Method D1945
- Iron (total and dissolved) by inductively coupled plasma (ICP) (United States Environmental Protection Agency [EPA] Method 6010A)
- Organic carbon (total and dissolved) by EPA Method 415.1
- Chloride and sulfate by SW9056

Groundwater (and MGP DNAPL, if required) sampling methods and equipment will be consistent with the current sampling program and in agreement with NWN's monitoring well sampling program in support of the source control measure. Field parameters including temperature, dissolved oxygen, specific conductance, pH, turbidity and oxidation reduction potential will be collected as part of the groundwater sampling events.

MFA will receive the data electronically from the laboratory, and the data will be transferred to an EQUIS<sup>®</sup> database. MFA will perform a quality assurance and quality control (QA/QC) review of the EQUIS<sup>®</sup> electronic data deliverable file received from the laboratory. The QA/QC review will include the elements of a Tier II data validation review. To document data reliability, a memorandum will be prepared summarizing evaluation procedures, the usability of the data, and deviations from specific field and/or laboratory methods.

Groundwater elevation data will be collected from the wells using transducers. The transducers will be synchronized with the OW-series transducers to the extent needed to evaluate changes in Fill WBZ groundwater induced by changes in river stage and/or the HC/C initial testing.

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## REPORTING


After the data have been received and evaluated, MFA will discuss the results and identify next steps with DEQ.

## SCHEDULE

MFA is prepared to schedule and commence work immediately following DEQ approval. We request that DEQ respond to this approach as soon as possible in order to be able to collect baseline conditions prior to the initial testing phase.

Sincerely,

Maul Foster & Alongi, Inc.



Kerry-Cathlin Gallagher  
Project Scientist



James G.D. Peale, RG  
Principal Hydrogeologist

Attachments:      Figures

cc:      Myron Burr, Siltronic Corporation  
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         Chris Reive, Jordan Ramis  
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# FIGURES





Path: X:\8128 01 Siltronic Corp\12\Projects\05\Fill Zone Well Installation\Fig1\_1963 Aerial and Current Site Features.mxd  
Project: 8128.01.12  
Produced By: jechane  
Approved By: K. Gallagher  
Print Date: 5/10/2013

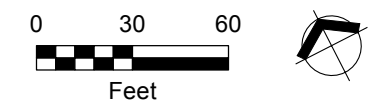
**Figure 1**  
**1963 Aerial and**  
**Current Site Features**

Siltronic Corp.  
Portland, Oregon

**Legend**

- Proposed Monitoring Well
- MFA Siltronic Monitoring Well
- Gasco Station
- TarGOST Boring (Approximate)
- Outfall (Approximate)
- Proposed Trench
- Top of Bank (Approximate)
- Extent of Pavement (2013)
- Current Building Footprint (2013)
- Siltronic Tax Lot (2013)

Note: Proposed monitoring well locations subject to modification based on field conditions



Source: Historical Aerial source is unknown.

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Siltronic Source Area